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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,367

11/15/2005

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EXAMINER

TAKEUCHI, YOSHITOSHI

ART UNIT

PAPER NUMBER

4162

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,367	Applicant(s) YAMAGUCHI ET AL.	
	Examiner YOSHITOSHI TAKEUCHI	Art Unit 4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>30 September 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-9, drawn to an electrode level difference absorbing print paste, including ceramic powder, binder resin, a plasticizer and a solvent.

Group II, claim(s) 10-19, drawn to a production method of an electronic device.

Group III, claim(s) 20, drawn to a production method of an electronic device.

2. The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: While Group I and II share the print paste, said print paste has been known prior to the instant invention. Sugimoto et al (US 5,429,846) teaches a print paste that includes ceramic powder, a binder resin, plasticizer and solvent with characteristics as claimed in claim 1. As a result, the invention lacks unity of invention *a posteriori*.

3. During a telephone conversation with Thomas Pardini on May 14, 2008 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Art Unit: 4162

4. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained.

Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 4162

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 7, the following chemicals are set off by brackets: dibutyl phthalate (DBP), diotyl phthalate (DOP), benzylbutyl phthalate (BBP), butyl butylene glycol (BPBG); and diotyle adipic acid (DOA). It is unclear whether these chemicals are provided as examples or if applicant intends the chemicals claimed to be an alternative grouping.

Similarly, regarding claim 9, “amine based surfactant” is set off by parenthesis. It is unclear whether “amine based surfactant” is an example of a cation based surfactant or the claimed chemical.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugimoto et al (US 5,429,846).

Regarding claim 1, Sugimoto teaches a ceramic slurry including a ceramic powder, a binder resin, a plasticizer and solvent (column 2, lines 20-29), wherein said

Art Unit: 4162

binder resin contains a polyacetal resin (polyvinyl butyl resin) with a polymerization degree of 1700 and a butyralation degree of 65 mol% (column 17, lines 52-57).

Regarding claim 2, Sugimoto teaches the use of 8 or 9 parts of an acetal resin to 100 parts of ceramic powder (column 13, lines 45-46; column 15, lines 31-32).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 4162

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al (US 5,429,846) in view of Miyazaki et al (US 6,599,463).

Regarding claim 3, Sugimoto teaches that the preferable organic solvent should have functional groups that enhance the affinity with the ceramic oxide. (Column 6, lines 3-5). However, Sugimoto does not teach the solvent being at least one of terpineol, dihydroterpineol, terpinyl acetate, dihydroterpinyl acetate and 4-(1'-acetoxy-1'-) cyclohexanol acetate. However, Miyazaki teaches the use of terpineol as a solvent. (Column 11, line 27). As a result, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a solvent such as terpineol, since it was known at the time of the invention to be used in ceramic slurries.

Regarding claim 4, Sugimoto teaches the use of solvent in the ratio of 100 to 1,000 parts by weight to 100 parts by weight of ceramic powder (e.g. column 2, lines 31-32, 38-39), but does not teach a ratio of solvent of 20 to 80 parts by weight to 100 parts by weight of the ceramic powder. However, Miyazaki teaches a ceramic slurry that uses 35 parts by weight to 100 parts by weight of ceramic powder. (Column 15, line 2). By using less solvent, less drying time is required and uniformity of the film surface can be controlled. It would have been obvious to one having ordinary skill in the art at the time of the invention to use less solvent to reduce the drying time and to improve the uniformity of the film surface.

Regarding claim 5, Sugimoto teaches viscosities within the range of 20 to 270 centipoise, but does not teach the claimed viscosity of 4 to 30 Pa-s at a shear rate of 8 [1/s]. However, Sugimoto teaches that the viscosity should be adjusted according to its intended use. (Column 1, lines 46-59). It would be obvious to one having ordinary skill in the art at the time of the invention to adjust the viscosity dependant on the intended use.

Regarding claim 6, Sugimoto teaches a ceramic slurry where the ceramic powder consists of 0.5 to 48 wt% of the entire slurry, where the ratio of solvent by weight to ceramic powder by weight is 1,000:100 to 100:100 (C_f 30 to 55 wt%, where the ratio of solvent by weight to ceramic powder by weight is 80:100 to 20:100). It would have been obvious to one having ordinary skill in the art at the time of the invention to have selected the overlapping portion of the ranges disclosed by the reference, for similar ratios of solvent to ceramic powder, because overlapping ranges have been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

Regarding claim 7, Sugimoto does not teach a ceramic slurry that contains at least one of phthalate ester, dibutyl phthalate (DBP), dioctyl phthalate (DOP), benzylbutyl phthalate (BBP), butyl butylene glycol (BPBG), adipic acid ester, diethylene adipic acid (DOA), sebacic acid ester, or sebacic dibutyl as a plasticizer. However, Miyazaki teaches the use of a phthalate ester (dioctyl phthalate) as a plasticizer. (Column 15, lines 48-49) It would have been obvious to one having ordinary skill in the art at the time of the invention to use a plasticizer, such as dioctyl phthalate, in order to increase the flowability of the ceramic and reduce waste resulting from delamination or microcracking.

Regarding claim 8, Sugimoto teaches a ceramic slurry, but does not teach one where the plasticizer contained is 20 to 200 parts by weight with respect to 100 parts by weight of a binder resin. However, Miyazaki teaches the use of dioctyl phthalate as a plasticizer in the ratio of 3 parts by weight to 7 parts by weight of polyvinyl butyral. (Column 15, lines 48-50). It would have been obvious to one having ordinary skill in the art at the time of the invention to have selected the range of plasticizer disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. In re Malagari, 182 USPQ 549.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al (US 5,429,846), in view of Miyazaki et al (US 6,599,463) and further in view of Suzuki et al (JP 2002313672). Sugimoto teaches a print paste but does not teach one using at least one of a hygroscopic polymer, cation based surfactant (amine based surfactant) and amphoteric surfactant as an antistatic agent. However, Suzuki teaches that static electricity becomes a strong influence in exfoliating the ceramic green sheet from the base material, especially for sheets less than 3 microns thick. (Detailed Description section, paragraph 0018). Suzuki teaches using an antistatic agent such as trimethylammonium salt (Detailed Description section, paragraph 0034) to prevent damage to a ceramic green sheet, which is less than 3 microns thick, during exfoliation from a base material. (Detailed Description section, paragraph 0018). It would have been obvious to one having ordinary skill in the art at the time of the invention to use an antistatic agent in print paste sheets that are less than 3 microns thick to reduce defects caused during exfoliation from the base material.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yoshitoshi Takeuchi/

/Jennifer McNeil/
Supervisory Patent Examiner, Art Unit 4162